Perspective

Sanitation Systems (/perspective/sanitation-systems-perspective)

Section

Sanitation Technologies (/sanitation-systems/sanitation-technologies)

Factsheet

Surface Disposal and Storage

العربية (/ar/sanitation-systems/sanitation-technologies/surface-disposal-and-storage)

Applicable to

System 1 (/humanitarian-crises/rural-settings/sanitation/sanitation-systems/system-1%3A-single-pit-system)

System 2 (/humanitarian-crises/rural-settings/sanitation/sanitation-systems/system-2%3A-waterless-pit-system-without-sludge-production)

System 3 (/humanitarian-crises/rural-settings/sanitation/sanitation-systems/system-3%3A-pour-flush-pit-system-without-sludge-production)

System 4 (/sanitation-systems

Application level

- City
- Household
- Neighborhood

Management level

- Household
- Public
- Shared

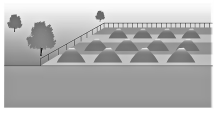
Inputs

- Dry Cleansing Materials
- Pre-Treatment Products
- Dried Faeces
- Compost
- Pit Humus
- Sludge

Outputs

/sanitation-systems
/system-4%3A-
waterless-system-
with-urine-diversion)
System 5
(/sanitation-systems
/sanitation-systems
/system-5%3A-
biogas-system)
System 6
(/humanitarian-
crises/rural-settings
/sanitation
/sanitation-systems
/system-6%3A-
blackwater-
treatment-system-
with-infiltration)
System 7
(/humanitarian-
crises/rural-settings
/sanitation
/sanitation-systems
/system-7%3A-
blackwater-
treatment-system-
with-effluent-
transport)
System 8
(/humanitarian-
crises/urban-
settings/sanitation
/sanitation-systems
/system-8%3A-
blackwater-
transport-
to-%28semi-%29-
centralized-
treatment-system)
System 9
(/sanitation-systems
/sanitation-systems

/system-9%3A-sewerage-system-with-urine-diversion)



Author/Compiled by
Eawag (Swiss Federal Institute of Aquatic Science and Technology)
Analiza Miso (Sustainable Sanitation Center, Xavier University)
Robert Gensch (Sustainable Sanitation Center, Xavier University)
Florian Faure (seecon international gmbh)

Adapted from

Compendium of Sanitation Systems and Technologies. 2nd Revised Edition (/node/5587)

Executive Summary

Surface disposal refers to the stockpiling of sludge, faeces or other materials that cannot be used elsewhere. Once the material has been taken to a surface disposal site, it is not used later. Storage refers to temporary stockpiling. It can be done when there is no immediate need for the material and a future use is anticipated, or when further hygienization and drying is desired before application.

Advantages

- May prevent unmitigated disposal
- Storage may render the product more hygienic
- Can make use of vacant or abandoned land
- Little operation skills or maintenance required
- Low capital and operating costs

Disadvantages

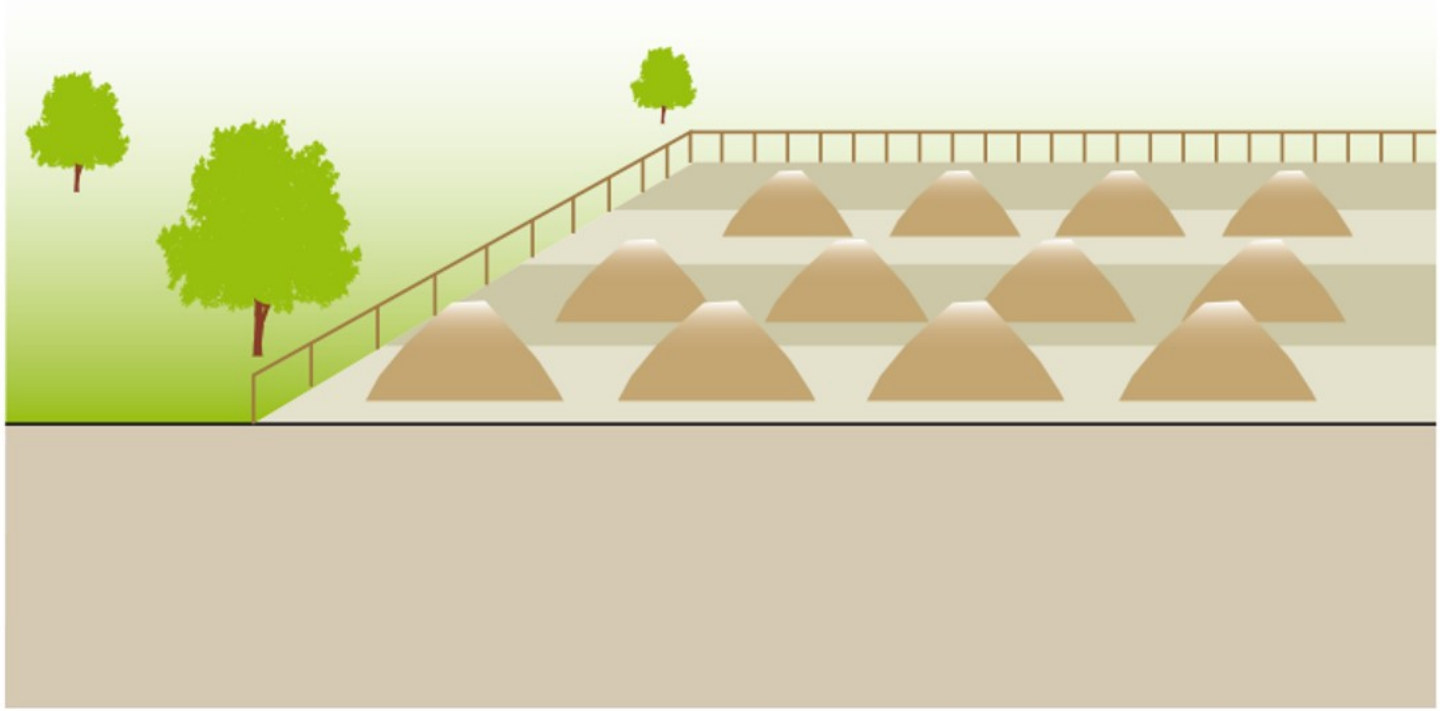
- Requires large land area
- Potential leaching of nutrients and contaminants into groundwater
- Surface disposal hampers the beneficial use of a resource
- Odours are normally noticeable (depending on prior treatment)
- May require special spreading equipment

In	Out

In	Out
Compost/Biosolids	-

Introduction

This technology is primarily used for sludge, although it is applicable for any type of dry, unusable material. One application of surface disposal is the disposal of dry cleansing materials, such as toilet paper, corn cobs, stones, newspaper and/or leaves. These materials cannot always be included along with other water-based products in some technologies and must be separated. A rubbish bin should be provided beside the user interface to collect the cleansing materials and menstrual hygiene materials. Dry materials can be burned (e.g., corn cobs) or disposed of along with the household waste. For simplicity, the remainder of this technology information sheet will be dedicated to sludge since standard solid waste practices are beyond the scope of **the Compendium (/node/7934)**.When there is no demand for or acceptance of the beneficial use of sludge, it can be placed in monofills (sludge-only **landfills (/water-nutrient-cycle/wastewater-treatment/hardwares/solid-waste/landfills)**) or heaped into permanent piles. Temporary storage contributes to further dehydration of the product and the die-off of pathogens before it is used.



Surface Disposal and Storage. Source: TILLEY et al. (2014)

Design Considerations

Landfilling sludge along with municipal solid waste (MSW) is not advisable since it reduces the life of a **landfill (/water-nutrient-cycle/wastewater-treatment/hardwares/solid-waste/landfills)**, which has been specifically designed for the containment of more noxious materials. As opposed to more centralized MSW landfills, surface disposal sites can be situated close to where the sludge is treated, limiting the need for long transport distances.

The main difference between surface disposal and **land application (/factsheet/use-of-dehydrated-faeces)** is the application rate. There is no limit to the quantity of sludge that can be applied to the surface since nutrient loads or agronomic rates are not a concern. Attention must be paid, however, to groundwater contamination and leaching. More advanced surface disposal systems may incorporate a liner and leachate collection system in order to prevent nutrients and contaminants from infiltrating the groundwater.

Sites for the temporary storage of a product should be covered to avoid rewetting by rainwater and the generation of leachate.

Health Aspects/Acceptance

If a surface disposal and storage site is protected (e.g., by a fence) and located far from the public, there should be no risk of contact or nuisance. The contamination of groundwater resources by leachate should be prevented by adequate siting and design Care should be taken to protect the disposal or storage site from vermin and pooling water, both of which could exacerbate smell and vector problems.

Operation & Maintenance

Staff should ensure that only appropriate materials are disposed of at the site and must maintain control over the traffic and hours of operation. Workers should wear appropriate protective clothing.

Applicability

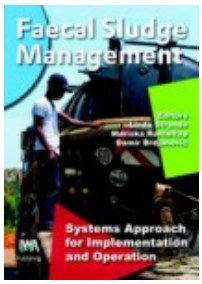
Since there are no benefits gained from surface disposal, it should not be considered as a primary option. However, where sludge use is not easily accepted, the contained and controlled stockpiling of solids is far preferable to uncontrolled dumping.Storage may in some cases be a good option to further dry and hygienize a material and to generate a safe, acceptable product. Storage may also be required to bridge the gap between supply and demand . Surface disposal and storage can be practiced in almost every climate and environment, although they may not be feasible where there is frequent flooding or where the groundwater table is high.

Media PPT

Surface Disposal Solids (PPT) (/media/33)

Library References

Faecal Sludge Management



This is the first book to compile the current state of knowledge on faecal sludge management. It addresses the organization of the entire faecal sludge management service chain, from the collection and transport of sludge, to the current state of knowledge of treatment options, and the final end use or disposal of treated sludge. It presents an integrated approach that brings together technology, management, and planning, based on Sandec's 20 years of experience in the field. It also discusses important factors to consider when evaluating and upscaling new treatment technology options. The book is designed for undergraduate and graduate students, engineers, and practitioners in the field who have some basic knowledge of environmental and/or wastewater engineering.

STRANDE, L. ; RONTELTAP, M. ; BRDJANOVIC, D. (2014): Faecal Sludge Management. Systems Approach for Implementation and Operation. London: IWA Publishing **URL (http://www.sandec.ch/fsm_book)** [Accessed: 16.07.2014]

Biosolids Generation, Use, and Disposal in the United States

This report gives an overview on the use and disposal of biosolids/sewage sludge in the US between 1998 and 2010.

U.S. EPA (1999): Biosolids Generation, Use, and Disposal in the United States. Washington: United States Environmental Protection Agency **URL (https://www.epa.gov/biosolids/biosolids-generation-use-and-disposal-united-states)** [Accessed: 26.05.2019]

A Plain English Guide to the EPA Part 503 Biosolids Rule

U.S. EPA (1994): A Plain English Guide to the EPA Part 503 Biosolids Rule. Washington: : United States Environmental Protection Agency (U.S. EPA) **URL (https://www.epa.gov/biosolids/plain-english-guide-epa-part-503-biosolids-rule)** [Accessed: 26.05.2019]